Service Manual

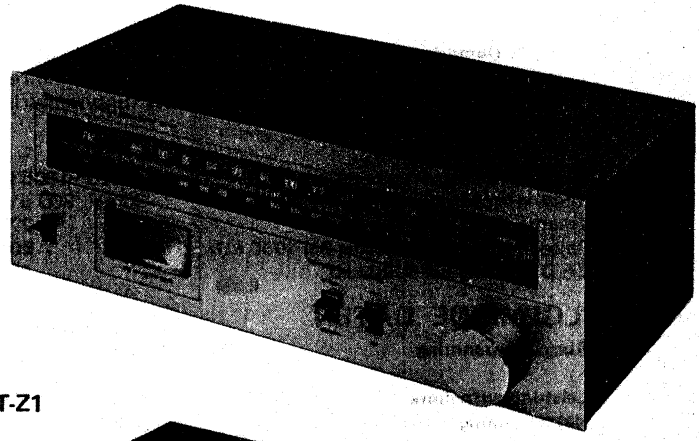
FM/AM Stereo Tuner

ST-Z1

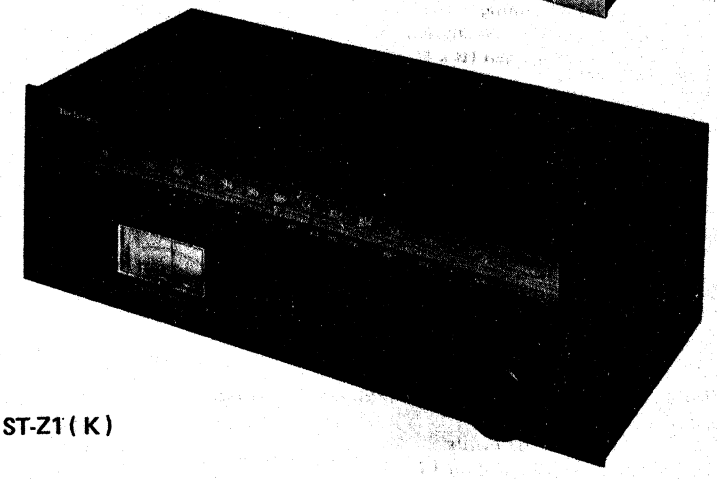
(E),(EG),(EB),
(XA),(XGH),(XAL)

ST-Z1(K)

(E),(EG),(XGH)



ST-Z1



ST-Z1(K)

*** The colors of this model include silver and black. The black type model is provided with (K) in the Service Manual.**

Areas

* (E) and (EG) are available in Scandinavia and European.
* (EB) is available in Belgium.
* (XA) is available in Asia, Latin America, Middle East and Africa.
* (XGH) is available in Holland.
* (XAL) is available in Australia.

■ TECHNICAL SPECIFICATIONS (DIN 45 500)

Specifications are subject to change without notice for further improvement.

FM TUNER SECTION

Frequency range	88~108 MHz
Sensitivity	2.0 μV (IHF, usable)
S/N 30 dB	2.0 μV (300Ω), 1.3 μV (75Ω)
S/N 26 dB	1.8 μV (300Ω), 1.2 μV (75Ω)
S/N 20 dB	1.6 μV (300Ω), 0.9 μV (75Ω)
IHF 46 dB stereo quieting sensitivity	25 μV/75Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	69 dB (75 dB, IHF)
STEREO	65 dB (70 dB, IHF)
Frequency response	20 Hz~15 kHz, +1 dB~−2 dB 20 Hz~13 kHz, +1.5 dB~−1.5 dB
Alternate channel selectivity	60 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	60 dB
IF rejection at 98 MHz	72 dB
Spurious response rejection at 98 MHz	80 dB
AM suppression	55 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	−30 dB (−35 dB, IHF)
38 kHz	−45 dB (−50 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	±1.5 dB
Limiting point	1.2 μV
Power bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	300Ω (balanced) 75Ω (unbalanced)

AM TUNER SECTION

Frequency range	525~1605 kHz
Sensitivity (S/N 20 dB)	30 μV, 300 μV/m
Selectivity	27 dB
Image rejection at 1,000 kHz	50 dB
IF rejection at 1,000 kHz	40 dB

GENERAL

Output voltage	0.3V (0.6 V, IHF)
Power consumption	18W
Power supply	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W x H x D)	410 x 142 x 223 mm (16-5/32" x 5-19/32" x 8-25/32")
Weight	3.3 kg (7.3 lb.)

Technics

Matsushita Electric Trading Co., Ltd.

■ TECHNISCHE DATEN (DIN 45 500)

Spezifikationen können infolge von Verbesserungen ohne Ankündigung geändert werden.

UKW-TUNERTEIL

Wellenbereich	88~108 MHz
Eingangsempfindlichkeit	2.0 µV (nutzbar nach IHF)
S/R 30 dB	2.0 µV (300Ω), 1.3 µV (75Ω)
S/R 26 dB	1.8 µV (300Ω), 1.2 µV (75Ω)
S/R 20 dB	1.6 µV (300Ω), 0.9 µV (75Ω)
Stereoumschalfschwelle bei 46 dB nach IHF	25 µV/75Ω
Gesamtklirrfaktor	
Mono	0.15%
Stereo	0.3%
Geräuschabstand	
Mono	69 dB (75 dB nach IHF)
Stereo	65 dB (70 dB nach IHF)
Frequenzgang	20 Hz~15 kHz (+1 dB~−2 dB)
	20 Hz~13 kHz (+1.5 dB~−1.5 dB)
Trennschärfe bei Störsender	60 dB
Einfangverhältnis	1.0 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	60 dB
ZF-Dämpfung bei 98 MHz	72 dB
Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz	80 dB
AM-Unterdrückung	55 dB
Übersprechdämpfung	
1 kHz	40 dB
10 kHz	30 dB
Trägerrest	
19 kHz	−30 dB (−35 dB nach IHF)
38 kHz	−45 dB (−50 dB nach IHF)
Kanalabweichung (250 Hz~6300 Hz)	±1.5 dB
Begrenzereinsatz	1.2 µV
Bandbreite	
ZF-Verstärker	180 kHz
UKW-Demodulator	1000 kHz
Antennenanschluß	300Ω (symmetrisch)
	75Ω (unsymmetrisch)

AM-TUNERTEIL

Wellenbereiche	525~1605 kHz
Eingangsempfindlichkeit (S/R 20 dB)	30 µV, 300 µV/m
Trennschärfe	27 dB
Spiegelfrequenz-Dämpfung bei 1000 kHz	50 dB
ZF-Dämpfung bei 1000 kHz	40 dB

ALLGEMEINE DATEN

Ausgangsspannung	0.3V
	(0.6V, IHF)
Leistungsaufnahme	18W
Netzspannung	Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V
Abmessungen (B x H x T)	410 x 142 x 223 mm
Gewicht	3.3 kg

■ DONNEES TECHNIQUES (DIN 45 500)

Sujet à changement sans préaris.

SECTION SYNTONISATEUR FM

Gamme de fréquence	88~180 MHz
Sensibilité	2.0 µV (IHF utilisable)
S/B 30 dB	2.0 µV (300Ω), 1.3 µV (75Ω)
S/B 26 dB	1.8 µV (300Ω), 1.2 µV (75Ω)
S/B 20 dB	1.6 µV (300Ω), 0.9 µV (75Ω)
Sensibilité stéréo au seuil de 46 dB, IHF	25 µV/75Ω
Distorsion harmonique totale	
MONO	0.15%
STEREO	0.3%
Signal/Bruit	
MONO	69 dB (75 dB, IHF)
STEREO	65 dB (70 dB, IHF)
Réponse de fréquence	20 Hz~15 kHz, +1 dB~−2 dB
	20 Hz~13 kHz, +1.5 dB~−1.5 dB
Sélectivité alternée par canal	60 dB
Taux de capture	1.0 dB
Rejection d'image à 98 MHz	60 dB
Rejection FI à 98 MHz	72 dB
Rejection de réponse parasite à 98 MHz	80 dB
Suppression AM	55 dB
Séparation stéréophonique	
1 kHz	40 dB
10 kHz	30 dB
Fuite de porteuse	
19 kHz	−30 dB (−35 dB, IHF)
38 kHz	−45 dB (−50 dB, IHF)
Equilibrage de canaux (250 Hz~6,300 Hz)	±1.5 dB
Point de limite	1.2 µV
Largeur de bande	
Amplificateur FI	180 kHz
Démodulateur FM	1000 kHz
Bornes d'antenne	300Ω (symétrique)
	75Ω (asymétrique)

SECTION SYNTONISATEUR AM

Gamme de fréquence	525~1605 kHz
Sensibilité (S/B 20 dB)	30 µV, 300 µV/m
Sélectivité	27 dB
Réjection d'image à 1,000 kHz	50 dB
Réjection FI à 1,000 kHz	40 dB

DIVERS

Tension de sortie	0.3 V
	(0.6V, IHF)
Consommation	18W
Alimentation	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (L x H x Pr)	410 x 142 x 223 mm
	(16-5/32" x 5-19/32" x 8-25/32")
Poids	3.3 kg (7.3 lb.)

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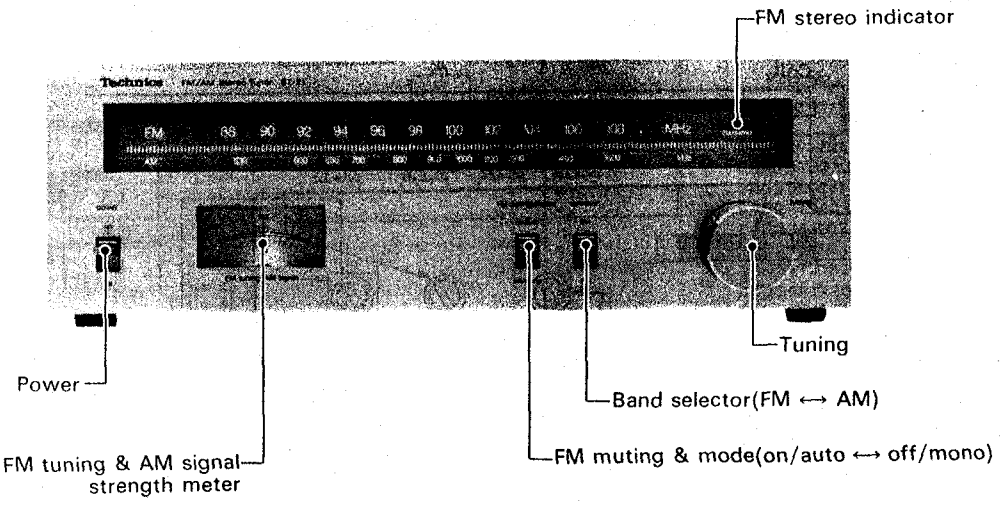
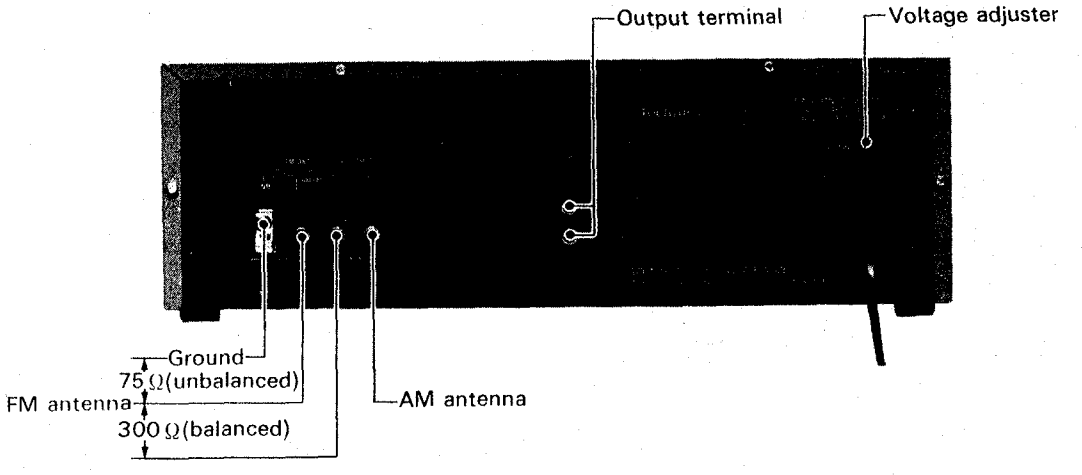
■ LOCATION OF CONTROLS

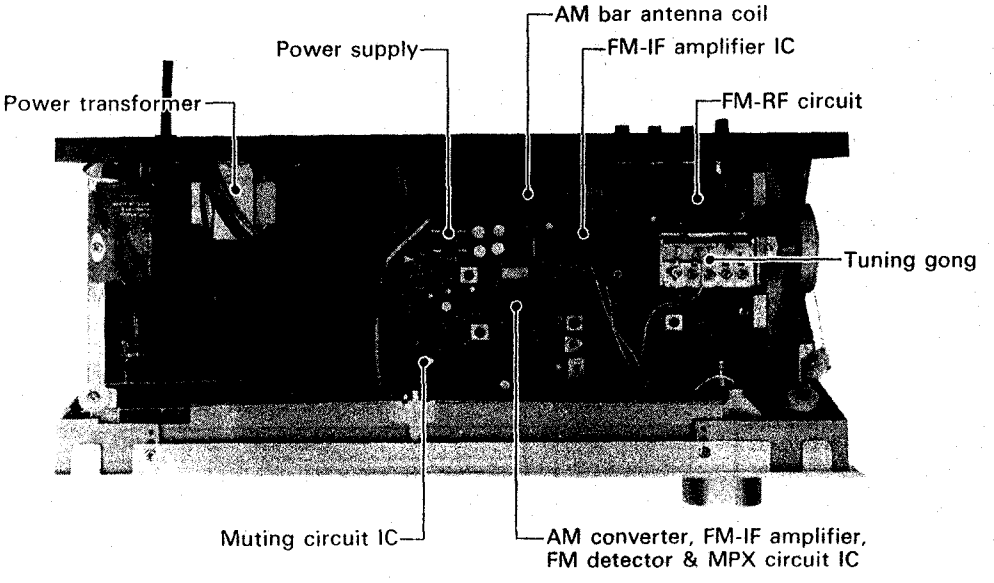
- **Front side view**



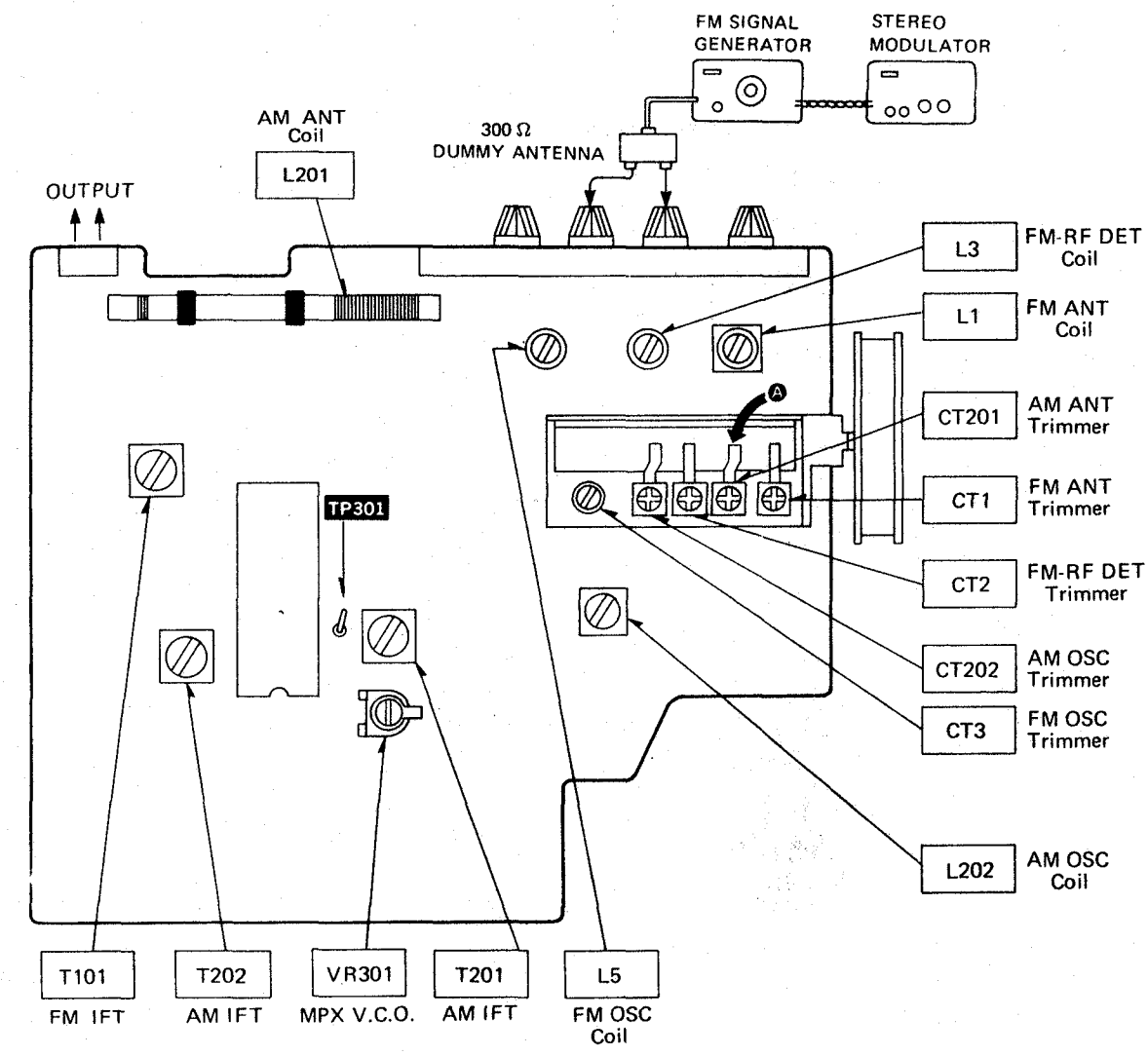
- **Rear side view**

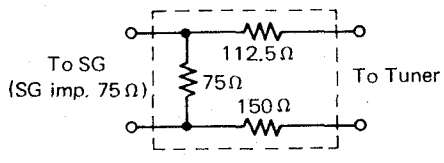


- **Inside view**



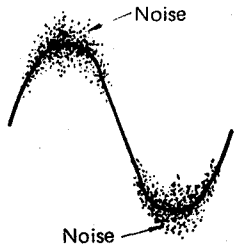
■ ADJUSTMENT POINTS





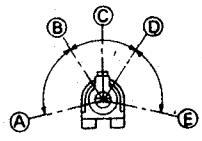
300 Ω FM dummy antenna

Fig. 4 (Abb. 4)



AF output wave form

Fig. 5 (Abb. 5)



VR301

A–B,D–E: Stereo OFF Position.
B–D: Stereo ON Position (Indicator Lighting).
C: Adjust Point of MPX Circuit.

Fig. 6 (Abb. 6)

■ ADJUSTMENT INSTRUCTIONS ENGLISH

Notes:

1. Band selector switch . . . . . { AM (AM Alignment) / FM (FM Alignment)
2. FM muting & mode switch . . . . . off/mono
3. Maintain line voltage at rated voltage
4. 300Ω FM dummy antenna . . . Refer to fig. 4.
5. Output of signal generator should be no higher than necessary to obtain an output reading.

	AM/FM SIGNAL GENERATOR		DIAL SETTING	INDICATOR (VTVM or SCOPE)	ADJUSTMENT POINTS	REMARKS
	CONNECTION	FREQUENCY				
	AM ADJUSTMENT					
1	Higher side through 0.001μF to **AM** antenna trimmer terminal. Point Ⓐ Common to chassis.	450kHz (30% Mod. with 400 Hz)	Point of non-inter-ference	Connect AC VTVM or scope to "OUTPUT" terminals.	T201 (1st IFT) T202 (2nd IFT)	Adjust the input frequency and adjustment points so that the output becomes maximum.
2	Fashion loop of several turns of wire and radiate signal into loop of tuner.	600kHz (30% Mod. with 400Hz)	600kHz	Connect AC VTVM or scope to "OUTPUT" terminals.	L202 (OSC Coil) L201 (ANT Coil)	Adjust for maximum output. Adjust L201 by moving coil. bobbin along ferrite core.
3	Fashion loop of several turns of wire and radiate signal into loop of tuner.	1500kHz (30% Mod. with 400Hz)	1500kHz	Connect AC VTVM or scope to "OUTPUT" terminals.	CT202 (OSC Trimmer) CT201 (ANT Trimmer)	Adjust for maximum output. Repeat steps (2) and (3).
	FM-IF ADJUSTMENT					
4		No Signal	Point of non-inter-ference	Tuning meter of set	T101 (FM IFT)	Adjust for center position of tuning meter.
	FM-RF ADJUSTMENT					
5	Connect to FM 300Ω antenna terminal through 300Ω FM dummy antenna.	90MHz (100% Mod. with 400Hz) weak input.	90MHz	Connect scope to "OUTPUT" terminal.	L5 (OSC Coil) L3 (RF DET Coil) L1 (ANT Coil)	• Add weak input so that noise is included in the output wave form. • Make the adjustment so that the output wave form is vertically symmetrical. (Fig. 5) • Repeat the steps (5) and (6) until the frequency correctly matches the dial scale.
6		106MHz (100% Mod. with 400Hz) weak input.	106MHz	Connect scope to "OUTPUT" terminal.	CT3 (OSC Trimmer) CT2 (RF DET Trimmer) CT1 (ANT Trimmer)	

FM MPX V.C.O. ADJUSTMENT

	Using a frequency counter	Using alternate system
7	1. 100MHz 60dB Non-modulated mono signal applied to set. 2. FM muting/mode switch to "on/auto". 3. Connect frequency counter to **TP301** through resistor (100kΩ). 4. Adjust **VR301** to 19kHz, ±30Hz.	1. Apply stereo signal from generator or stereo station to tuner. 2. Adjust **VR301** until stereo indicator lights up. Cement arm of **VR301** as shown in fig. 6.

■ ANWEISUNGEN FÜR ABGLEICHUNG [redacted] DEUTSCH [redacted]

(Für Deutschland)

Anmerkungen:

1. Bereichsschalter . . . . . { AM (Abgleich) / FM (UKW Abgleich)
2. FM Muting/Mode Schalter . . . off/mono
3. Die Netzspannung auf ihren Sollwert einstellen.
4. UKW-Kunstantenne, 300 ohm . . . Vgl. Abb. 4.
5. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute Ablesung.

	AM/UKW MESSENDER		SKALENZEI-GEREIN-STELLUNG DES TUNER	ANZEIGEGEIRÄT (Röhrenvoltmeter order Oszillograph)	ABGLEICHS-PUNKTE	BEMERKUNGEN
	ANSCHLUSS	FREQUENZ				
	MW-ABGLEICH					
1	Heißes Ende des Meßsenders über einen 0.001μf Kondensator an den AM Antenneneingang schließen. Ⓐ Kaltes Ende an Masse	450kHz (400Hz Modulat., 30%)	Kein Empfang	Wechselstrom Röhrenvoltmeter oder Oszillograph über den Ausgang "OUTPUT" schließen.	T201 (1. IFT) T202 (2. IFT)	Die Eingangsfrequenz auf Maximalwert einstellen.
2	Das Meßsendersignal induktiv in den Tuner speisen. Hierzu behelfsmäßig eine Rahmenantenne fertigen und an den Eingang schließen.	600kHz (400Hz Modulat., 30%)	600kHz	Wechselstrom Röhrenvoltmeter oder Oszillograph über den Ausgang "OUTPUT" schließen.	L202 (Osc. Spule) L201 (Ant. Spule)	• Auf max. Ausgang abgleichen. • L201 wird abgleichen, in dem die Spule am Ferritstab entlanggeschoben wird.
3	Das Meßsendersignal induktiv in den Tuner speisen. Hierzu behelfsmäßig eine Rahmenantenne fertigen und an den Eingang schließen.	1500kHz (400Hz Modulat., 30%)	1500kHz	Wechselstrom Röhrenvoltmeter oder Oszillograph über den Ausgang "OUTPUT" schließen.	CT202 (Osc. Trimmer) CT201 (Ant. Trimmer)	• Auf max. Ausgang abgleichen. • Schritt (2) und (3) sind zu wiederholen.
	UKW-ZF-ABGLEICH					
4		Kein Signal	Kein Empfang	Abstimmanzeige.	T101 (FM IFT)	Aut Mittenstellung der Abstimmanzeige abgleichen.
	UKW-HF-ABGLEICH					
5	Meßsender üder eine Kunstantenne an den UKW-Antenneneingang schließen.	87.5MHz (400Hz Modulat., 100%) Schwacher Eingang	87.5MHz (Frequenz min.)	Oszillograph über den Ausgang "OUTPUT" schließen.	L5 (Osc. Spule)	• Einen schwachen Eingang geben, bei dem Geräusch in der Ausgangswellenform enthalten wird. • So einstellen, daß die Ausgangswellenform vertikal symmetrisch wird. (Abb. 5) • Die Einstellung von (5),(6) und (7) wiederhoten, bis die Frequenz mit der Skala übereinstimmt.
6	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen.	90MHz (400Hz Modulat., 100%) Schwacher Eingang	90MHz	Oszillograph über den Ausgang "OUTPUT" schließen.	L3 (Det. Spule) L1 (Ant. Spule)	
7	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen.	106MHz (400Hz Modulat., 100%) Schwacher Eingang	106MHz	Oszillograph über den Ausgang "LUTPUT" schließen.	CT3 (Osc. Trimmer) CT2 (Det. Trimmer) CT1 (Ant. Trimmer)	

UKW-STEREO-DEKODER-ABGLEICH

	UNTER VERWENDUNG EINES ZÄHLERS	ALTERNATIV-MEß METHODE
8	1. Unmoduliertes Mono-Signal 100MHz in das Gerät speisen. 2. FM muting/mode-Schalter auf "on/auto" stellen. 3. Zähler über einen Widerstand 100K ohm an **TP301** schließen. 4. **VR301** auf 19kHz±30Hz einstellen.	1. Stereosignal entweder von einem Stereogenerator. oder einem Sender einspeisen. 2. **VR301** so einstellen, bis die Stereolampe auf leuchtet. Schleifer von **VR301** sichern, wie in Abb. 6 gezeigt.

■ INSTRUCTIONS D'ALIGNEMENT — FRANÇAIS

Notes:

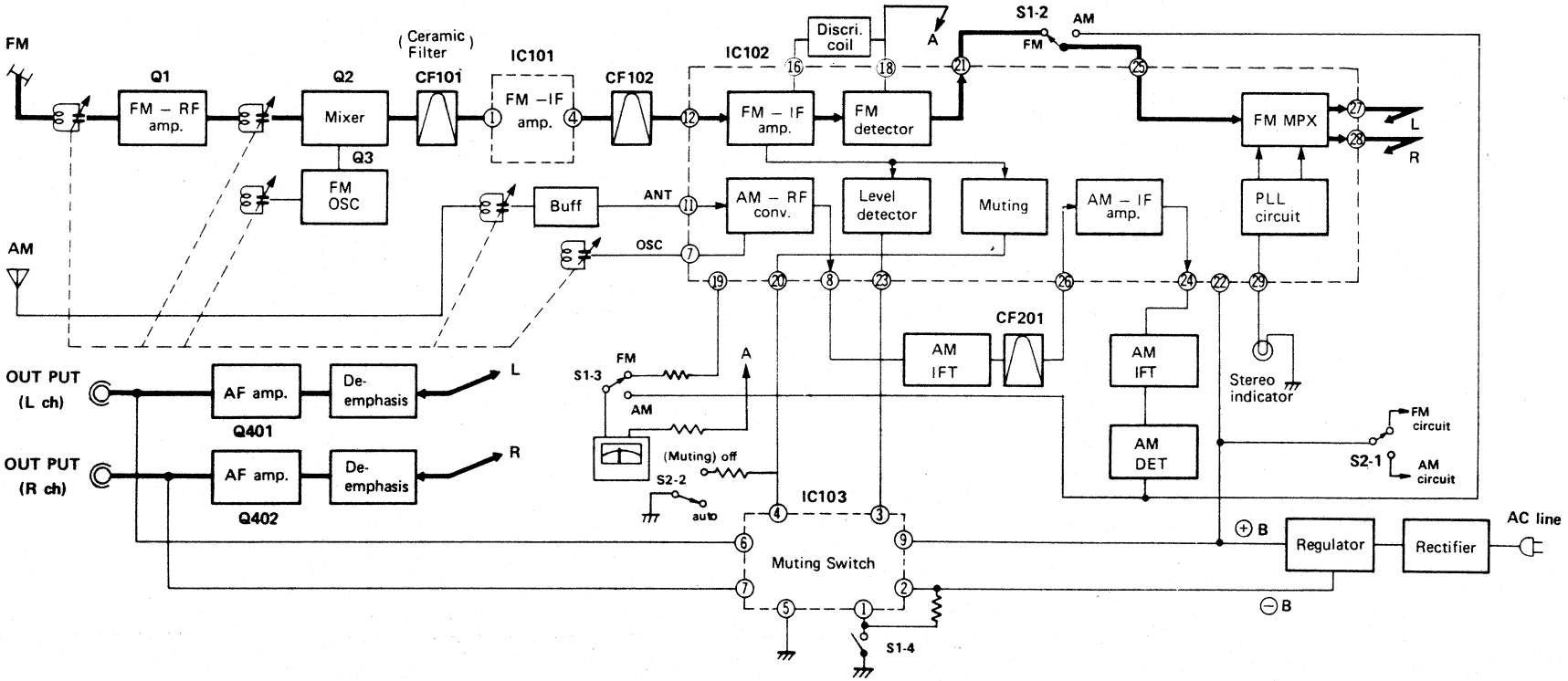
1. Sèlecteur de gamme . . . . . { AM (Alignement AM) / FM (Alignement FM)
2. Commutateur de silencieux/mode . . off/mono
3. Conserver la tension du secteur à la tension nominale.
4. Antenne fictive FM 300Ω . . . . Voir fig. 4.
5. Le signal du générateur ne doit pas être plus éleve qu'il n'est nécessaire à obtenir une lecture en sortie.

	AM GENERATEUR		AIGUILLE SUR LE CADRAN	INDICATEUR (VOLTMETRE ELECTRONIQUE OSCILLOSCOPE)	POINTS DE REGLAGE	OBSERVATIONS
	BRANCHEMENT	FREQUENCE				
	ALIGNEMENT AM					
1	Côté chaud, à travers 0.001μF, sur le trimmer de l'antenne AM Ⓐ commum an shâssis.	450kHz (modulé à 30% par 400Hz)	Point sans signal	C.A. voltmètre électronique ou oscilloscope sur prise de sortie de l'appareil.	T201 (1 transfo FI) T202 (2 transfo FI)	• Réguler la fréquence d'entrée de telle sorte que la sortie soit maximale.
2	Faire une boucle de quelgues tours et rayonner le signal dans le cadre du tuner.	600kHz (modulé à 30%) par 400Hz)	600kHz	C.A. voltmètre électronique ou oscilloscope sur prise de sortie de l'appareil.	L202 (bobine OSC) L201 (bobine ANT)	• Régler au maximum de signal de sortie. • Régler L201 en déplacant la bobine le long du noyau de ferrite.
3	Faire une boucle de quelgues tours et rayonner le signal dans le cadre du tuner.	1500kHz (modulé à 30%) par 400Hz)	1500kHz	C.A. voltmètre électronique ou oscilloscope sur prise de sortie de l'appareil.	CT202 (trimmer OSC) CT201 (trimmer ANT)	• Régler au maximum de signal de sortie • Recommencez les étapes (2) et (3).
	ALIGNEMENT FI-FM					
4		Sans signal	Point sans signal	Indicateur d'accord de l'appareil	T101 (Transfo FI)	Regler pour atteindre position mediane sur l'indicateur d'accord.
	ALIGNEMENT RF-FM					
5	Branchez sur la prise d'antenne FM à travers une antenne fictive FM	90MHz (modulé à 100% par 400Hz) Entrée faible	90MHz	Oscilloscope sur prise de sortie du tuner.	L5 (bobine OSC) L3 (bobine DET) L1 (bobine ANT)	• Appliquer une entrée faible de telle sorte que le parasite soit compris dans la forme de l'onde de sortie. • Faire le réglage de telle sorte que la forme de l'onde de sortie soit verticalement symétrique. (Voir fig. 5) • Refaire les réglages (5) et (6) jusqu'à ce que la fréquence corresponde correctement avec l'échells du cadran
6	Branchez sur la prise d'antenne FM à travers une antenne fictive FM.	106MHz (modulé à 100% par 400Hz) Entrée faible	106MHz	Oscilloscope sur prise de sortie du tuner.	CT3(trimmer OSC) CT2(trimmer DET) CT1(trimmer ANT)	

ALIGNEMENT DU PILOTE MULTIPLEX FM

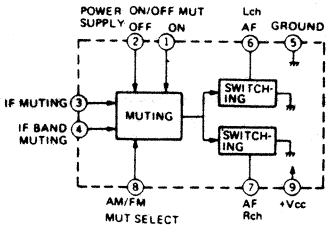
AVEC UN ERÉQUENCEMÉNTRE	PAR UN OUTRE SYSTÈME
1. Signal mono 100MHz non modulé appliqué à l'appareil. 2. Commutateur de silencieux sur "on/auto". 3. Branchez le fréquencemètre sur **TP301** à travers une résistance de 100kΩ. 4. Régler **VR301** sur 19kHz±30Hz.	1. Appliquez à l'appareil un signal stéréo provenant d'un générateur ou de la réception d'un émetteur. 2. Régler **VR301** jusqu à ce que l'indicateur de stéréophonic s'allume. Collez le curseur le **VR301** comme indiqué sur la fig. 6.

■ BLOCK DIAGRAM OF THIS UNIT

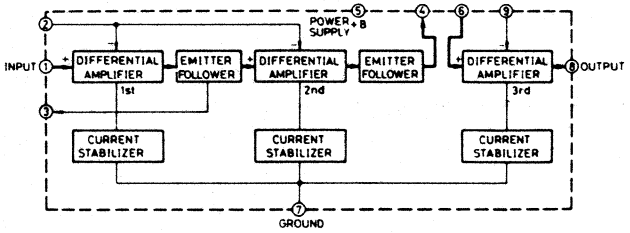


■ BLOCK DIAGRAM OF IC'S

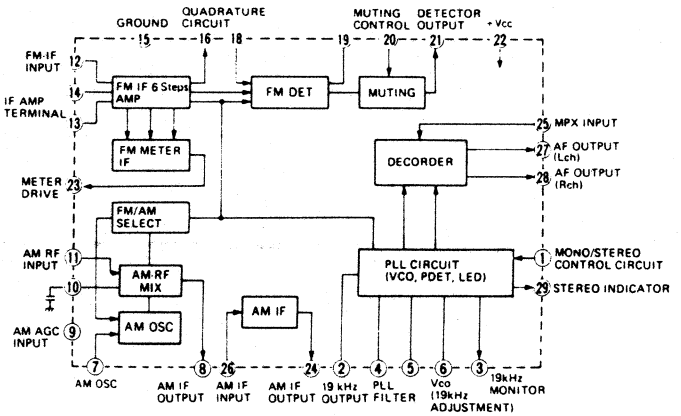
- This is the basic block diagram of the inside circuit of IC. In an actual circuit, there may be sometimes idle terminals or some different functions other than the basic circuit.



IC103(AN6135)
Muting switching



IC101 (AN278)
FM IF amplifier

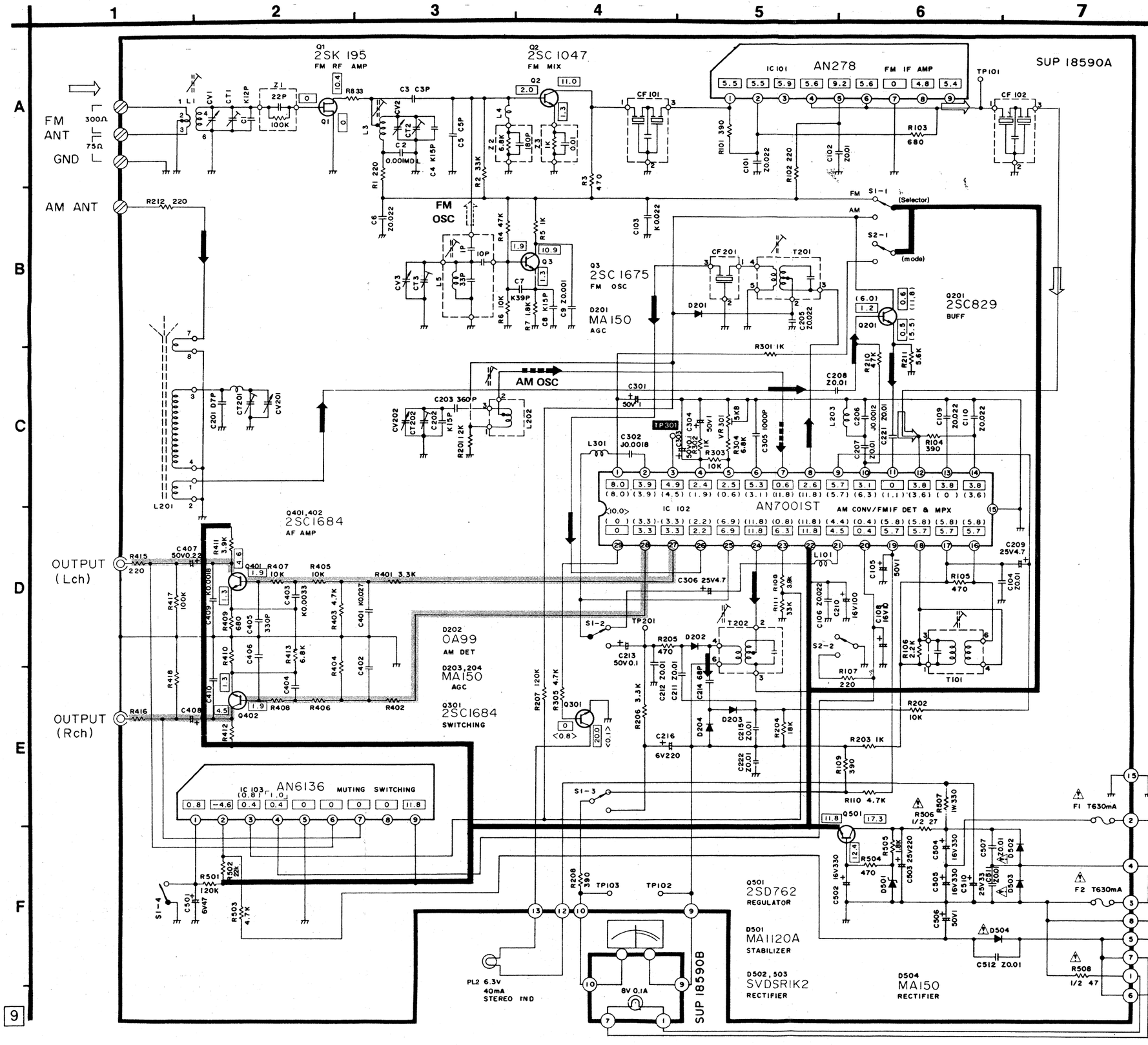


IC102 (AN7001ST)
AM converter, FM IF amplifier, detector & MPX

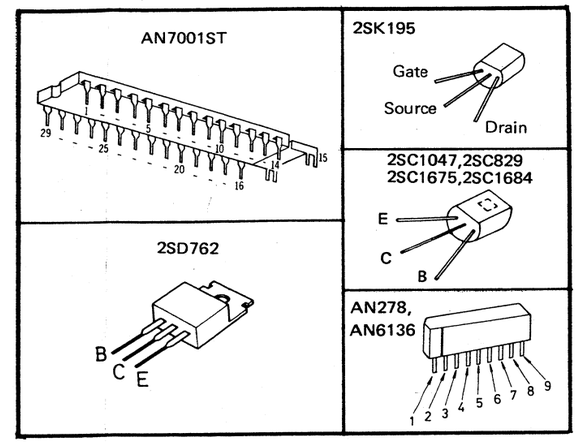
ST-Z1

■ SCHEMATIC DIAGRAM

* This schematic diagram may be modified at any time with the development of new technology.



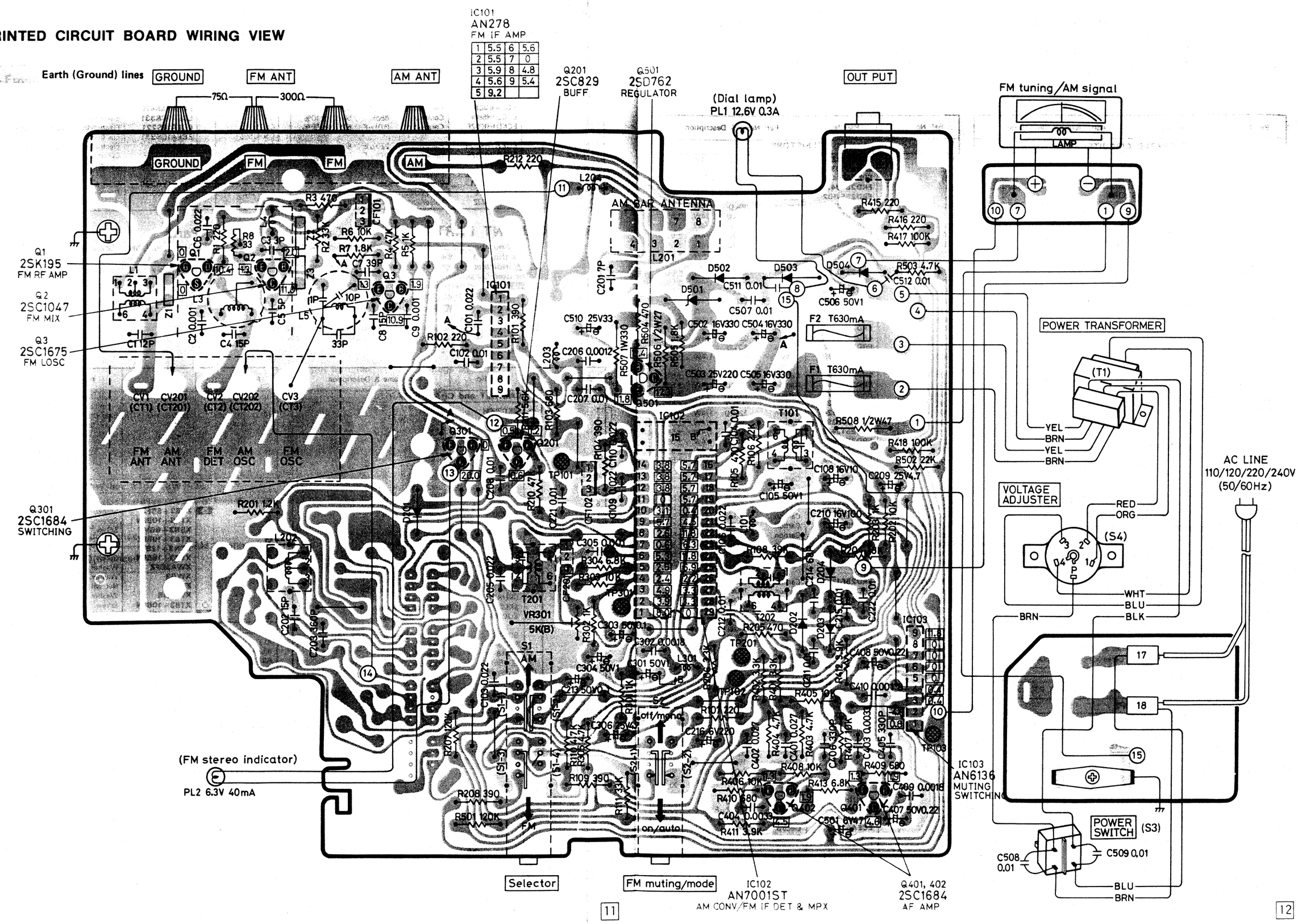
● Terminal guide of Transistor & IC



Notes:

1. **S1-1~1-4:** Selector switch in **"FM"** position. **FM ⟷ AM**
2. **S2-1, 2-2:** FM muting and FM mode switch in **"on/auto"** position. **on/auto ⟷ off/mono**
3. **S3:** Power switch in **"on"** position.
4. **S4:** AC voltage adjuster in **"240V"** position.
5. Indicated voltage are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard.
   Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
   - Figures in ▭ stand for DC voltage in FM mode.
   - Figures in < > stand for DC voltage in FM stereo signal reception mode.
   - Figures in ⌜ ⌟ stand for DC voltage in FM (no signal) muting to on mode.
   - Figures in ( ) stand for DC voltage in AM mode.
6. Signal lines
   ⇨ FM ➡ AM ➡ Audio Frequency
7. ▬ Positive voltage lines
8. ⚠ indicates that only parts specified by the manufacturer be used for safety.

■ PRINTED CIRCUIT BOARD WIRING VIEW



■ REPLACEMENT PARTS LIST ·····Electric Parts

NOTES: 1. Part numbers are indicated on most mechanical parts please use this part number for parts orders.
2. ⚠ indicates that only parts specified by the manufacturer be used for safety.

Ref. No.		Part No.	Part Name & Description
INTEGRATED CIRCUITS			
IC101		AN278	IC, FM IF Amplifier
IC102		AN7001SW	IC, AM Conv FM IF Detector & MPX
IC103		AN6136	IC, Muting Switching
TRANSISTORS			
Q1		2SK195 -H2	Transistor, FM RF Amplifier
Q2		**2SC1047-C**	Transistor, FM Mixer
Q3		2SC1675 -L1	Transistor, FM Oscillator
Q201		**2SC829-C**	Transistor, Buffer
Q301 401 402		2SC1684 R	Transistor, Switching & AF Amplifier (Use in ranks R, S or T)
Q501		2SD762 O	Transistor, Regulator (Use in ranks O or P)
DIODES			
D201, 203 204, 504	⚠	**MA162A**	Diode, AGC & Rectifier
D202		**2-OA99**	Diode, AM Detector
D501		**RVDRD12FB**	Diode, Zener 12V
D502, 503	⚠	**SVDSR1K2**	Rectifier
COILS and TRANSFORMERS			
L1		SLA4N15	Coil, FM Antenna
L3		SLD4P21-P	Coil, FM RF Detector
L4		**RLQY15G5**	Coil, Choke
L5		SLO4P75-P	Coil, FM Local Oscillator
L101		SLQX101-3M	Coil, Choke
L201		SLF2C29	Coil, AM Antenna
L202		SLO2C17	Coil, AM Local Oscillator
L203		SLQX101 3M	Coil, Choke
L204		**RLQY15G5**	Coil, Choke
L301		SLQX393-1Z	Coil, Choke
T101		SLI4C519	Transformer, FM Discriminator
T201		SLI2C129R-M	Transformer, AM IF
T202		SLI2C413R	Transformer, AM IF
T501(Other Areas)	⚠	SLT5K97-W	Transformer, Power Source
T501(XAL)only	⚠	SLT5K99-W	Transformer, Power Source
COMPONENT COMBINATIONS			
Z1		EXRP220K104C	Component Combination, 100kΩ & 22pF
Z2		EXRP181K682C	Component Combination, 68kΩ & 180pF
Z3		EXRP103P102C	Component Combination, 1kΩ & 0.01μF
CERAMIC FILTERS			
CF101		SVFE107MM-A	Ceramic Filter, Red, 10.7MHz
		SVFE107MM-B	Ceramic Filter, Blue, 10.67MHz
		SVFE107MM-C	Ceramic Filter, Orange, 10.73MHz
CF102		SVFE107MZ2-A	Ceramic Filter, Red, 10.7MHz
		SVFE107MZ2-B	Ceramic Filter, Blue, 10.67MHz
		SVFE107MZ3-C	Ceramic Filter, Orange, 10.73MHz
		(Use pair ranks as same as CF101 and CF102)	
CF201		SVFSFU450B	Ceramic Filter, AM 450kHz
FUSES			
F1, 2	⚠	XBA2C06TRO	Fuse, T630mA(250V), P.T. Transformer
LAMPS			
PL1	⚠	**XAM43PA**	Lamp, Dial Light (12.6V 300mA)
PL2		XAMR38S200B	Lamp, Stereo Indicator (6.3V 400mA)
SWITCHES			
S1		SSL173	Switch, Selector
S2		SSL167	Switch, FM Muting and FM Mode
S3	⚠	ESL21227S	Switch, Power Source
S4	⚠	ESE372	Switch, Voltage Adjuster
VARIABLE RESISTORS			
VR301		**EVTS3MA00B53**	PLL Voltage Adjustment, 5kΩ(B)
VARIABLE CAPACITORS			
CV1, 2, 3, 201, 202 (CT1, 2, 3, 201, 202)		ECV5MD34X71G	Tuning Gang, FM & AM (with Trimmer)

Ref. No.		Part No.	Part Name & Description			
RESISTORS						
R1		**ERD25FJ221**	Carbon,	220Ω,	1/4W,	±5%
R2		**ERD25TJ333**	Carbon,	33kΩ,	1/4W,	±5%
R3		**ERD25FJ471**	Carbon,	470Ω,	1/4W,	±5%
R4		**ERD25TJ473**	Carbon,	47kΩ,	1/4W,	±5%
R5		**ERD25FJ102**	Carbon,	1kΩ,	1/4W,	±5%
R6		**ERD25FJ103**	Carbon,	10kΩ,	1/4W,	±5%
R7		**ERD25FJ182**	Carbon,	1.8kΩ,	1/4W,	±5%
R8		**ERD25FJ330**	Carbon,	33Ω,	1/4W,	±5%
R101		**ERD25FJ391**	Carbon,	390Ω,	1/4W,	±5%
R102		**ERD25FJ221**	Carbon,	220Ω,	1/4W,	±5%
R103		**ERD25FJ681**	Carbon,	680Ω,	1/4W,	±5%
R104		**ERD25FJ391**	Carbon,	390Ω,	1/4W,	±5%
R105		**ERD25FJ471**	Carbon,	470Ω,	1/4W,	±5%
R106		**ERD25FJ222**	Carbon,	2.2kΩ,	1/4W,	±5%
R107		**ERD25FJ221**	Carbon,	220Ω,	1/4W,	±5%
R108		**ERD25FJ392**	Carbon,	3.9kΩ,	1/4W,	±5%
R109		**ERD25FJ391**	Carbon,	390Ω,	1/4W,	±5%
R110		**ERD25FJ472**	Carbon,	4.7kΩ,	1/4W,	±5%
R111		**ERD25TJ333**	Carbon,	33kΩ,	1/4W,	±5%
R201		**ERD25FJ122**	Carbon,	1.2kΩ,	1/4W,	±5%
R202		**ERD25FJ103**	Carbon,	10kΩ,	1/4W,	±5%
R203		**ERD25FJ102**	Carbon,	1kΩ,	1/4W,	±5%
R204		**ERD25TJ183**	Carbon,	18kΩ,	1/4W,	±5%
R205		**ERD25FJ471**	Carbon,	470Ω,	1/4W,	±5%
R206		**ERD25FJ332**	Carbon,	3.3kΩ,	1/4W,	±5%
R207		**ERD25TJ124**	Carbon,	120kΩ,	1/4W,	±5%
R208		**ERD25FJ391**	Carbon,	390Ω,	1/4W,	±5%
R210		**ERD25TJ473**	Carbon,	47kΩ,	1/4W,	±5%
R211		**ERD25FJ562**	Carbon,	5.6kΩ,	1/4W,	±5%
R212		**ERD25FJ221**	Carbon,	220Ω,	1/4W,	±5%
R301, 302		**ERD25FJ102**	Carbon,	1kΩ,	1/4W,	±5%
R303		**ERD25FJ103**	Carbon,	10kΩ,	1/4W,	±5%
R304		**ERD25FJ682**	Carbon,	6.8kΩ,	1/4W,	±5%
R305		**ERD25FJ472**	Carbon,	4.7kΩ,	1/4W,	±5%
R401, 402		**ERD25FJ332**	Carbon,	3.3kΩ,	1/4W,	±5%
R403, 404		**ERD25FJ472**	Carbon,	4.7kΩ,	1/4W,	±5%
R405, 406		**ERD25FJ103**	Carbon,	10kΩ,	1/4W,	±5%
R407, 408		**ERD25FJ103**	Carbon,	10kΩ,	1/4W,	±5%
R409, 410		**ERD25FJ681**	Carbon,	680Ω,	1/4W,	±5%
R411, 412		**ERD25FJ392**	Carbon,	3.9kΩ,	1/4W,	±5%
R413		**ERD25FJ682**	Carbon,	6.8kΩ,	1/4W,	±5%
R415, 416		**ERD25FJ221**	Carbon,	220Ω,	1/4W,	±5%
R417, 418		**ERD25TJ104**	Carbon,	100kΩ,	1/4W,	±5%
R501		**ERD25TJ124**	Carbon,	120kΩ,	1/4W,	±5%
R502		**ERD25TJ223**	Carbon,	22kΩ,	1/4W,	±5%
R503		**ERD25FJ472**	Carbon,	4.7kΩ,	1/4W,	±5%
R504		**ERD25FJ471**	Carbon,	470Ω,	1/4W,	±5%
R505		**ERD25FJ182**	Carbon,	1.8kΩ,	1/4W,	±5%
R506	⚠	**ERD50FJ270**	Carbon,	27Ω,	1/2W,	±5%
R507		**ERG1ANJ331**	Metal Oxide,	330Ω,	1W,	±5%
R508	⚠	**ERD50FJ470**	Carbon,	47Ω,	1/2W,	±5%
CAPACITORS						
C1		ECCD1H120KC	Ceramic,	12pF,	50V,	±10%
C2		ECKD1H102MDA	Ceramic,	0.001μF,	50V,	±20%
C3		ECCD1H030CC	Ceramic,	3pF,	50V,	±0.25pF
C4		ECCD1H150KC	Ceramic,	15pF,	50V,	±10%
C5		ECCD1H050CC	Ceramic,	5pF,	50V,	±0.25pF
C6		ECKD1H223ZF	Ceramic,	0.022μF,	50V,	$\pm^{80}_{20}$%
C7		ECCD1H390KC	Ceramic,	39pF,	50V,	±10%
C8		ECCD1H150KC	Ceramic,	15pF,	50V,	±10%
C9		ECKD1H102ZF	Ceramic,	0.001μF,	50V,	$\pm^{80}_{20}$%
C101		ECKD1H223ZF	Ceramic,	0.022μF,	50V,	$\pm^{80}_{20}$%
C102		ECKD1H103ZF	Ceramic,	0.01μF,	50V,	$\pm^{80}_{20}$%
C103		ECQM1H223KZ	Polyester,	0.022μF,	50V,	±10%
C104		ECKD1H103ZF	Ceramic,	0.01μF,	50V,	$\pm^{80}_{20}$%
C105		**ECEA50Z1**	Electrolytic,	1μF,	50V	
C106		ECKD1H223ZF	Ceramic,	0.022μF,	50V,	$\pm^{80}_{20}$%
C108		**ECEA1HS100**	Electrolytic,	10μF,	50V	
C109, 110		ECKD1H223ZF	Ceramic,	0.022μF,	50V,	$\pm^{80}_{20}$%
C201		ECCD1H070D	Ceramic,	7pF,	50V,	±0.5pF
C202		ECCD1H150KC	Ceramic,	15pF,	50V,	±10%

Ref. No.		Part No.	Part Name & Description
C203		ECQP1361JZ	Polypropylene, 360pF, 100V, ±5%
C205		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80 −20 %
C206		ECQM1H122JZ	Polyester, 0.012μF, 50V, ±5%
C207, 208		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80 −20 %
C209		**ECEA25Z4R7**	Electrolytic, 4.7μF, 25V
C210		**ECEA1ES101**	Electrolytic, 100μF, 25V
C211, 212		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80 −20 %
C213		**ECEA50ZR1**	Electrolytic, 0.1μF, 50V
C214		ECCD1H680K	Ceramic, 68pF, 50V, ±10%
C215		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80 −20 %
C216		**ECEA1HS221**	Electrolytic, 220μF, 50V
C221, 222		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80 −20 %
C301		**ECEA50Z1**	Electrolytic, 1μF, 50V
C302		ECQM1H182JZ	Polyester, 0.0018μF, 50V, ±5%
C303		**ECEA50ZR1**	Electrolytic, 0.1μF, 50V
C304		**ECEA50Z1**	Electrolytic, 1μF, 50V
C305		ECQP1102JZ	Polypropylene, 0.001μF, 100V, ±5%

Ref. No.		Part No.	Part Name & Description
C306		**ECEA25Z4R7**	Electrolytic, 4.7μF, 25V
C401, 402		ECQM1H273KZ	Polyester, 0.027μF, 50V, ±10%
C403, 404		ECQM1H332KZ	Polyester, 0.0033μF, 50V, ±10%
C405, 406		ECKD1H331KB	Ceramic, 330pF, 50V, ±10%
C407, 408		**ECEA50ZR22**	Electrolytic, 0.22μF, 50V
C409, 410		ECQM1H182KZ	Polyester, 0.0018μF, 50V, ±10%
C501		**ECEA1AS470**	Electrolytic, 47μF, 10V
C502		**ECEA1CS331**	Electrolytic, 330μF, 16V
C503		**ECEA1ES221**	Electrolytic, 220μF, 25V
C504, 505		**ECEA1CS331**	Electrolytic, 330μF, 16V
C506		**ECEA50Z1**	Electrolytic, 1μF, 50V
C507		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80 −20 %
C508, 509	⚠	ECKDKC103PF	Ceramic, 0.01μF, 400VAC, +100 −0 %
C510		**ECEA1VS330**	Electrolytic, 33μF, 35V
C511, 512		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80 −20 %

■ REPLACEMENT PARTS LIST ·····Cabinet & Chassis Parts

NOTES:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. ⚠ indicates that only parts specified by the manufacturer be used for safety.
3. [K] -marked parts are used for black type only, while ○ -marked parts are for silver type only.
4. Parts other than [K] -and ○ -marked are used for both black and silver types.
5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

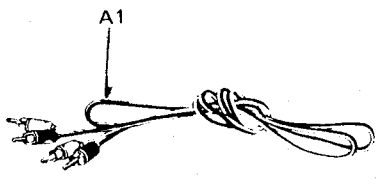
* Black type model: ST-Z1 (K)

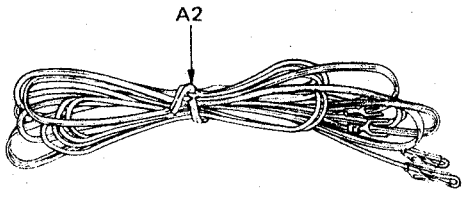
* (E) and (EG) are available in Scandinavia and European.
* (EB) is available in Belgium.
* (XA) is available in Asia, Latin America, Middle East and Africa.
* (XGH) is available in Holland.
* (XAL) is available in Australia.

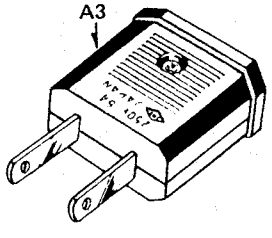
Ref. No.		Part No.	Part Name & Description
CABINET and CHASSIS PARTS			
1	○	SKC390H	Cabinet
1	[K]	SKC390B	Cabinet (Black)
2	○	SYW271	Panel, Front Ass'y
2	[K]	SYW271—1	Panel, Front Ass'y (Black)
3	○	SBN917	Knob, Tuning
3	[K]	SBN917—1	Knob, Tuning (Black)
4	○	SKD3870—7	Scale, Dial
4	[K]	SKD3870—5	Scale, Dial
5		SHG1533	Spacer, Rubber
6	○	SGX6795	Bracket, Dial Lamp
6	[K]	SGX6795—1	Bracket, Dial Lamp (Black)
7	○	SHR5089	Cover, Lever Switch
7	[K]	SHR5089—1	Cover, Lever Switch (Black)
8	○	SBD31	Knob, Lever Switch
8	[K]	SBD31—1	Knob, Lever Switch (Black)
9		SSM157N	Meter, FM Tuning & AM Signal
10		SDT8063	Shaft, Tuning (with Flywheel)
11	○	SGX6797	Bracket, Dial Scale
11	[K]	SGX6797—1	Bracket, Dial Scale (Black)
12		SKU8410	Bottom Board
13		SKL227	Foot, Bottom Board
14		SUW1665	Bracket, Dial Scale
15		SUR117	Bracket, Pulley
16		SHD3X1F	Shaft, Pulley
17		**RDR8—1**	Pulley, Dial Cord
18		SDZ051—2	Cord, Dial 180cm(70-15/16")
19	○	SDP5079	Pointer, Dial
19	[K]	SDP5079—1	Pointer, Dial
20		SHP41	Spacer, Dial Pointer Slide
21		SFSR4N4	Bushing, AC Cord
22 [Other Areas]	⚠	**RJA23ZC**	AC Cord
22 [XAL] only	⚠	**QFC1208M**	AC Cord
23		SJF3247N	Terminal, Output

Ref. No.		Part No.	Part Name & Description
24		SHR401—1	Latch, Antenna Terminal
25		SJF4419—2	Terminal, Antenna
26 [E] only		SGP2250A	Rear Panel
26 [Other Areas]		SGPTZ1X	Rear Panel
27		SDD47—1	Drum, Variable Capacitor
28		SDSA4121	Spring, Dial Cord
29		SMXA65	Cover, Capacitor (C508, C509)
30		SUR119	Bracket, Pulley
SCREWS, NUTS and WASHERS			
❶	○	**XTB3+8BFN**	Screw, Tapping, ⊕ 3×8
❶	[K]	**XTB3+8BFZ**	Screw, Tapping, ⊕ 3×8
❷		**XTB3+10BFN**	Screw, Tapping, ⊕ 3×10
❸		**XSN3+6BVS**	Screw, ⊕ 3×6
❹		**XTB3+10BFZ**	Screw, Tapping, ⊕ 3×10
❺		**XTN3+12B**	Screw, ⊕ 3×12
❻		**XTB3+16BFN**	Screw, Tapping, ⊕ 3×16
❼		**XWA3BFZ**	Washer, Spring, φ3
❽		**XWG3**	Washer, Plain, φ3
❾		**XNS11**	Nut, M11
❿		**XWD11B**	Washer, Toothed Lock
⓫	○	**XTB3+10BFN**	Screw, Tapping, ⊕ 3×10
⓫	[K]	**XTB3+10BFZ**	Screw, Tapping, ⊕ 3×10
ACCESSORIES			
A1		SJP2129—5	Cord, PIN Connection
A2		SSA267	Cord, FM Indoor Antenna
A3 (XA) only	⚠	SJP5213—1	Plug Adaptor, AC Power
PACKING PARTS			
P1	○	SPG2441	Carton Box
P1	[K]	SPG2457	Carton Box
P2		SPS2559	Pad, Left Side
P3		SPS2561	Pad, Right Side
P4		SPP659	Polyethylene Bag
P5		SQF10373	Instruction Book, Printed Matter

● Accessories



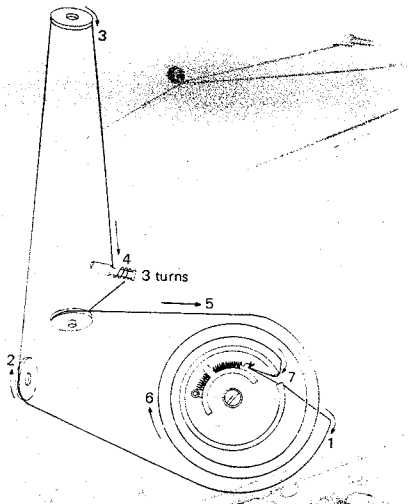




■ DIAL CORD INSTALLATION GUIDE

- For threading a fresh cord, proceed as follows.

1. Prepare a fresh cord more than 180cm (70-15/16") in length.
2. Bring the variable capacitor into a state where the drum is completely turned to the right (maximum capacity and lowest frequency for the variable capacitor).
3. Direct the cord in the order from 1 to 9.
4. Stretch the cord in such a tension as the spring length is elongated by 1.5 times that of the original state.
5. Fix the knot of the cord with the adhesive.



■ DISASSEMBLY INSTRUCTIONS

How to remove the cabinet and the bottom board.

1. Remove 6 setscrews of the cabinet. (Ⓐ screws in fig.1)
2. Remove 6 setscrews of the bottom board. (Ⓑ screws in fig.1)

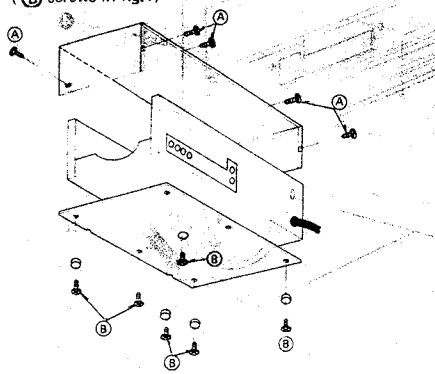


Fig. 1

How to remove the front panel.

3. Pull out 1 knob (tuning) from front panel. (Ⓒ knob in fig.2)
4. Remove 7 setscrews of the front panel. (Ⓓ screws in fig.2)

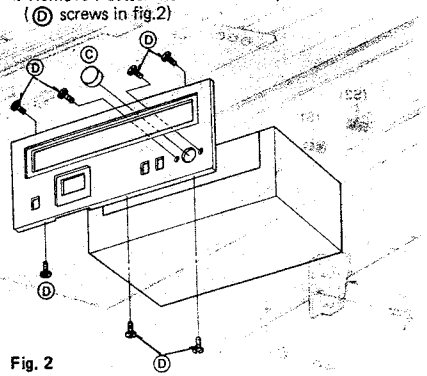


Fig. 2

How to remove the dial scale

5. Remove the front panel and cabinet.
6. Remove 3 setscrews of the dial scale bracket. (Ⓔ screws in fig. 3)

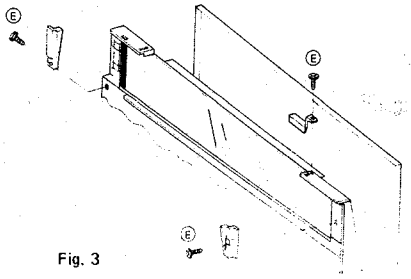
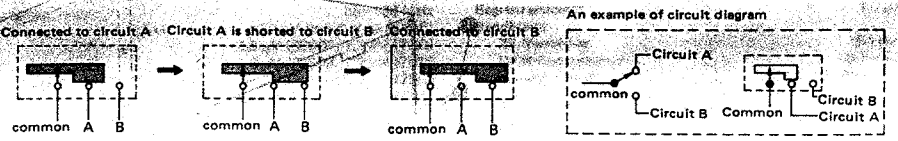


Fig. 3

● **Shorting Switch**

This unit uses a shorting switch. As illustrated below, the circuit is shorted to the next circuit without being opened. In the circuit diagram, the shaded area represents the common terminal.



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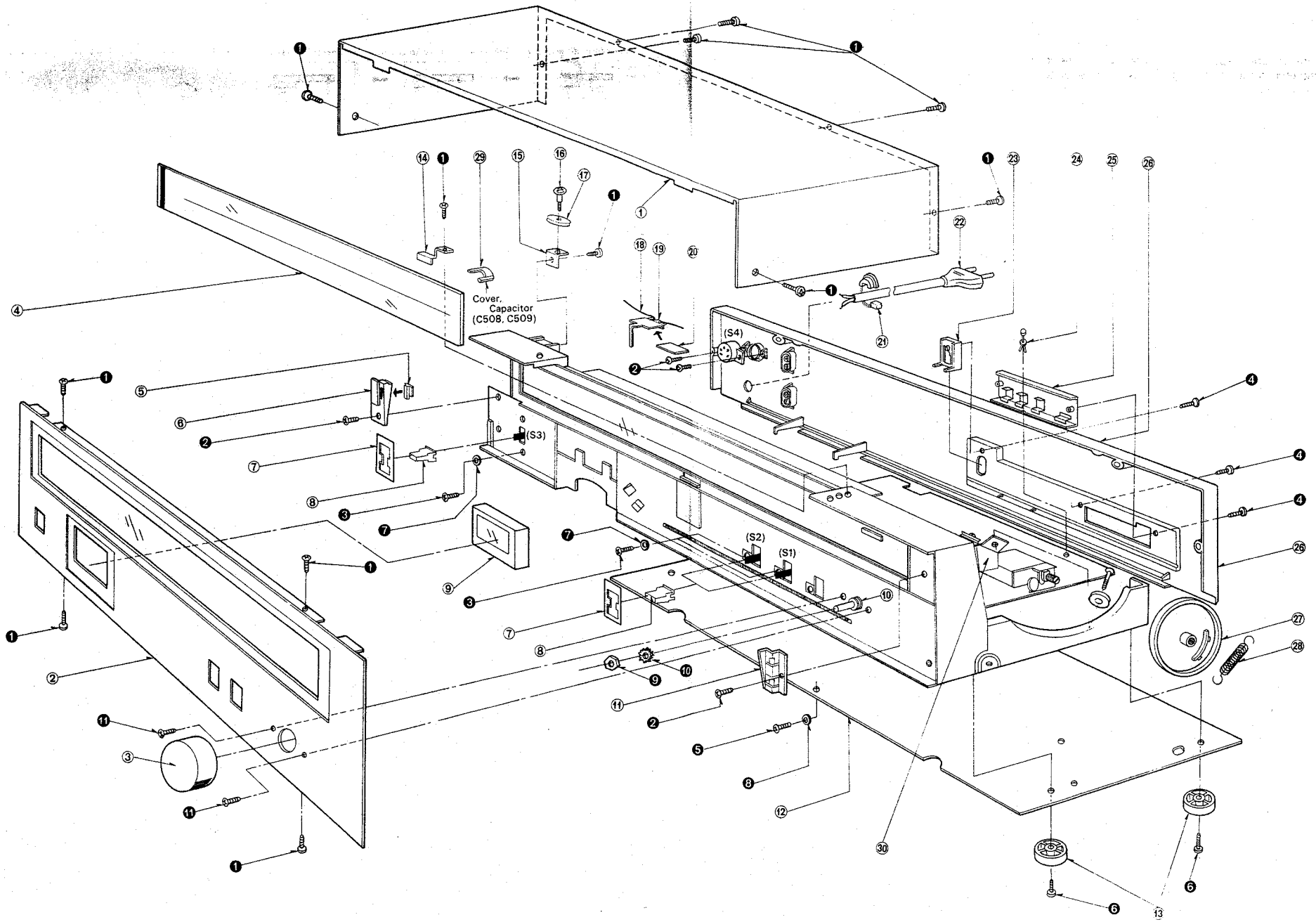
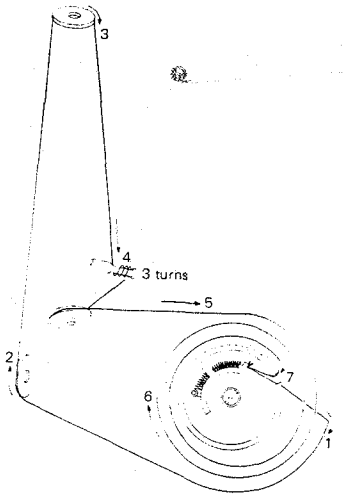


■ DIAL CORD INSTALLATION GUIDE

• For threading a fresh cord, proceed as follows.

1. Prepare a fresh cord more than 180cm (70-15/16") in length.
2. Bring the variable capacitor into a state where the drum is completely turned to the right (maximum capacity and lowest frequency for the variable capacitor).
3. Direct the cord in the order from 1 to 9.
4. Stretch the cord in such a tension as the spring length is elongated by 1.5 times that of the original state.
5. Fix the knot of the cord with the adhesive.



■ DISASSEMBLY INSTRUCTIONS

How to remove the cabinet and the bottom board.

1. Remove 6 setscrews of the cabinet. (Ⓐ screws in fig.1)
2. Remove 6 setscrews of the bottom board. (Ⓑ screws in fig.1)

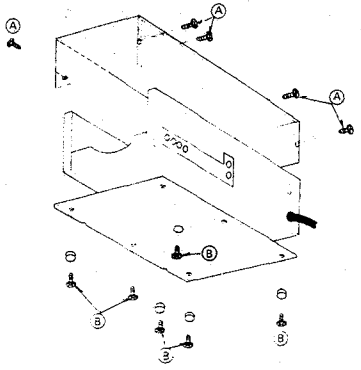


Fig. 1

How to remove the dial scale

5. Remove the front panel and cabinet.
6. Remove 3 setscrews of the dial scale bracket. (Ⓔ screws in fig. 3)

How to remove the front panel.

3. Pull out 1 knob (tuning) from front panel. (Ⓒ knob in fig.2)
4. Remove 7 setscrews of the front panel. (Ⓓ screws in fig.2)

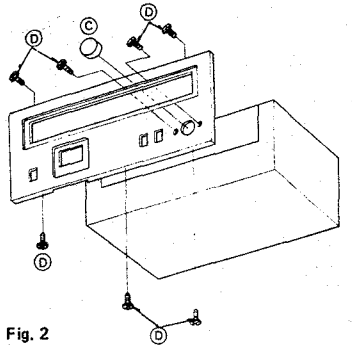


Fig. 2

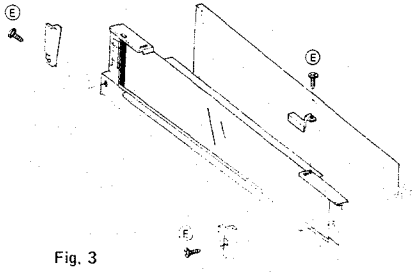
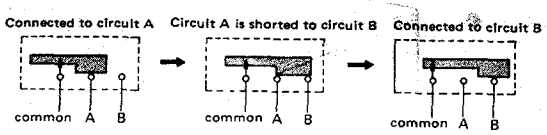


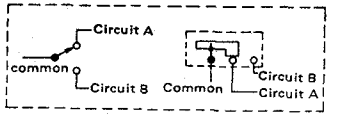
Fig. 3

• **Shorting Switch**

This unit uses a shorting switch. As illustrated below, the circuit is shorted to the next circuit without being opened. In the circuit diagram, the shaded area represents the common terminal.



An example of circuit diagram



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